

SUMMARY
BIOLOGICAL OPINION FOR EMERGENCY FIRE SUPPRESSION IN THE PAKOON
BASIN AND PROGRAMMATIC FIRE SUPPRESSION DURING 1996
ON THE ARIZONA STRIP DISTRICT, BUREAU OF LAND MANAGEMENT

Date of Opinion: March 6, 1996

Action Agency: Bureau of Land Management, Arizona Strip District, St. George, Utah

Project: Emergency fire suppression for multiple fires in the Pagoon Basin, Mohave County, Arizona, that burned approximately 20,000 acres, of which 50 to 70 percent was desert tortoise habitat. Also addressed in this consultation is all fire suppression activity in desert tortoise habitat on the Arizona Strip District during calendar year 1996.

Location: Desert tortoise habitat in the Pagoon Basin, Virgin Slope, and Beaver Dam Slope, Mohave County, Arizona.

Listed Species Affected: Mojave population of the desert tortoise, *Gopherus agassizii*, a federally listed threatened species with critical habitat.

Biological Opinion: Non-jeopardy, no destruction or adverse modification of critical habitat

Incidental Take Statement:

Level of take anticipated: Anticipated take includes one desert tortoise during emergency fire suppression activities, and, during 1996, three desert tortoises in the form of direct mortality from fire or suppression activities, one tortoise in the form of harm resulting from habitat destruction or degradation caused by backfires, and ten desert tortoises in the form of harassment, as animals are move out of harm's way. Exceeding this level may require reinitiation of formal consultation.

Reasonable and Prudent Measures: The biological opinion presents four measures for reducing incidental take. Implementation of these measures through the terms and conditions are mandatory.

Terms and Conditions: Nineteen mandatory terms and conditions are included to implement the reasonable and prudent measures. They include a variety of measures to reduce incidental take of desert tortoises, such as avoidance of taking individual animals (including moving animals out of harm's way, when necessary), environmental education for fire personnel, designation of resource advisors, minimizing off-road vehicle activity, maximizing protection of desert tortoise habitat, and maintaining sanitary conditions to minimize attraction of desert tortoise predators. Measures are also included in regards to monitoring and reporting of take and habitat loss.

Conservation Recommendations: The Bureau should take the following actions: 1) promptly complete an amendment to the Arizona Strip District Resource Management Plan that will implement the desert tortoise recovery plan; 2) initiate and coordinate a programmatic consultation on the effects of fire suppression activities throughout the range of the Mojave population of the desert tortoise; and 3) study the effects of chemical fire retardants on the desert tortoise and its habitat. Implementation of conservation recommendations is discretionary.



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Fish and Wildlife Service

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In Reply Refer To:

AESO/SE
2-21-95-F-379

March 6, 1996

MEMORANDUM

TO: Area Manager, Shivwits Resource Area, Bureau of Land Management,
St. George, Utah

FROM: Field Supervisor

SUBJECT: Biological Opinion for Emergency Fire Suppression in the Pakoon Basin and
Programmatic Fire Suppression in Desert Tortoise Habitat on the Arizona Strip
District During the 1996 Fire Season

This biological opinion responds to your request for initiation of formal consultation with the Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated July 14, 1995, and received by us on July 17, 1995. At issue are impacts that resulted from emergency fire suppression activities in the Pakoon Basin during June and July, 1995, and impacts that may result from subsequent fire suppression activities in desert tortoise habitat on the Arizona Strip District, Mohave County, Arizona, during the 1996 fire season (through December 31, 1996). These impacts may affect the Mojave population of the desert tortoise, *Gopherus agassizii*, a federally listed threatened species, and critical habitat designated for the species.

This biological opinion was prepared using information from the following sources: your July 14, 1995, request for initiation of consultation and accompanying documentation, including a memorandum dated July 10, 1995, from the Wildlife Biologist of Shivwits Resource Area to the Area Manager (Bureau of Land Management 1995a), a desert tortoise briefing for fire fighters (Bureau 1995b), recommended measures to reduce take of tortoises and loss of desert tortoise habitat during fire suppression (Duck et al. 1994) (these measures are used by Shivwits Resource Area in desert tortoise habitat, Tim Duck, Bureau, Shivwits Resource Area, pers. comm., July 1995); informal consultation between our staffs; and our files. Literature cited in this biological opinion is not a complete bibliography of all literature available on the desert tortoise, the effects of fire, or of other subjects addressed herein. A complete administrative record of this consultation is on file in this office.

In this biological opinion the Service finds that the effects of emergency fire suppression activities during the Pakoon Fires and anticipated effects of fires likely to occur during calendar year 1996 are not likely to jeopardize the continued existence of the desert tortoise

or destroy or adversely modify critical habitat designated for this species. Nineteen terms and conditions are described to reduce take associated with the proposed action.

CONSULTATION HISTORY

Emergency formal consultation was initiated after-the-fact for fire suppression activities that occurred during lightning-caused fires in the Pakoon Basin from June 29 to July 5, 1995. Ted Cordery of this office was contacted by George Cropper, Area Manager, Shivwits Resource Area on July 1, 1995, after a juvenile desert tortoise had been crushed under the tires of a fire suppression vehicle earlier that same day. Mr. Cropper and Mr. Cordery discussed measures employed to reduce take of tortoises and loss of habitat. During this conversation, no additional or new mitigation measures were identified. Mr. Cropper and Mr. Cordery agreed that an emergency consultation would be initiated at the earliest possible date to address fire suppression activities and the take that occurred during the Pakoon fires. Prior to this discussion, the Service and the Bureau had been in informal consultation concerning fire suppression activities throughout the range of the Mojave population of the desert tortoise. A Fire Management and Desert Tortoise Workshop was held January 17-19, 1995, in Boulder City, Nevada, at which representatives from Service offices in Arizona, Nevada, and Utah discussed the formulation of a rangewide, programmatic fire suppression consultation with representatives from the Bureau and the National Park Service. Measures for reducing the possibility of take resulting from fire suppression activities were discussed, including measures used by the Bureau in the Pakoon fires, as presented in Duck et al. (1994).

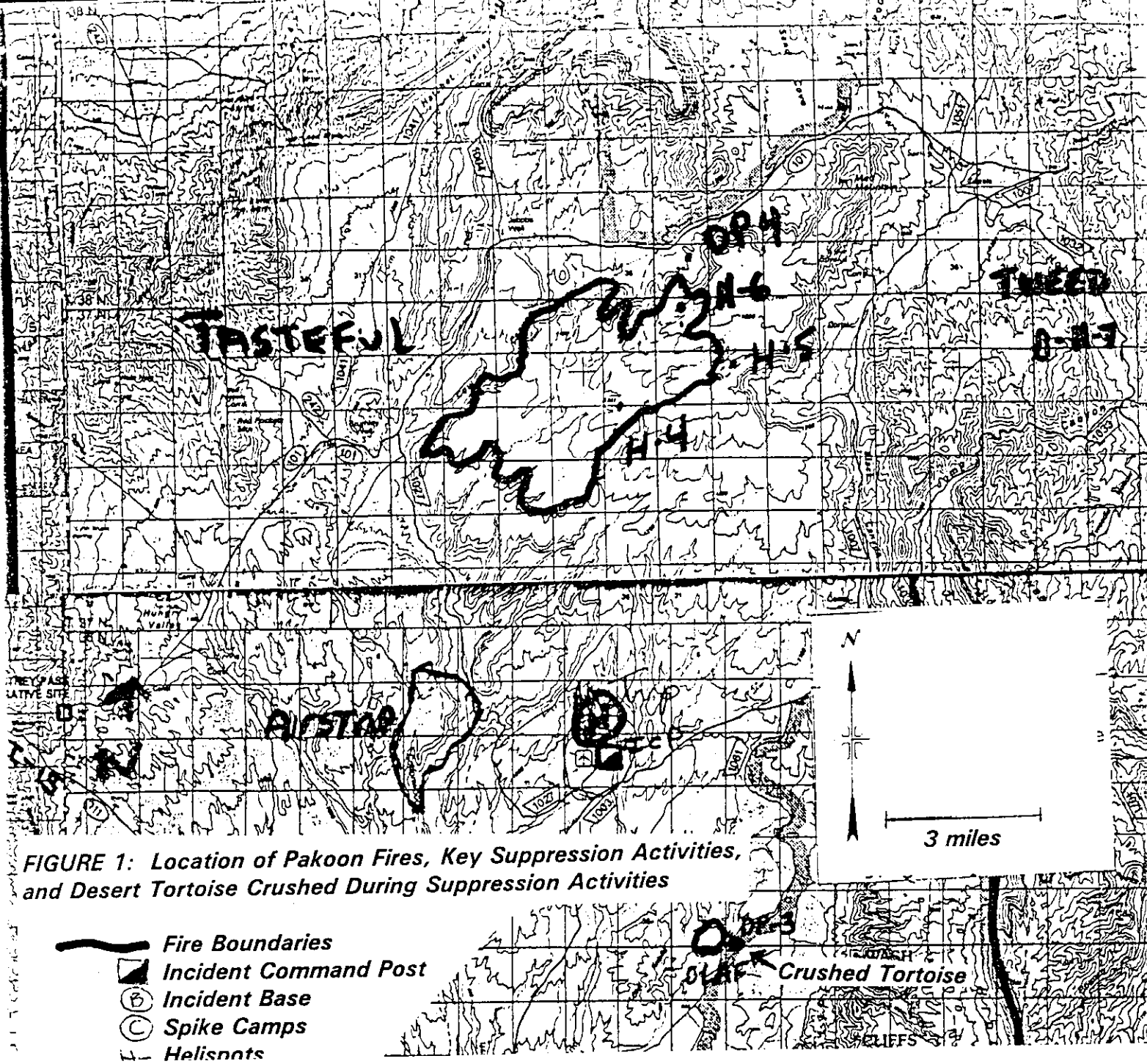
On August 17, 1995, we sent you via facsimile mail draft terms and conditions from this opinion and asked for comments. In an October 20, 1995, memorandum, we again requested comments on the draft terms and conditions. In a November 1, 1995, memorandum, your office requested a 90 day extension of the consultation period to complete necessary internal coordination on the consultation. We responded in a November 7, 1995, memorandum concurring with your request to extend the consultation period until February 27, 1996. In a phone call on February 26, 1996, Tim Duck of your office informed Jim Rorabaugh of my staff that internal coordination was complete and the consultation could be finalized.

BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

Pakoon Fires

Lightning strikes ignited several fires in the Pakoon Basin of the Arizona Strip on June 29, 1995. Fire crews were on the scene the same day and all fires were contained by July 5. The fires consumed approximately 20,000 acres, of which an estimated 50 to 70 percent was desert tortoise habitat. A tortoise was apparently crushed by a fire vehicle on July 1 on the wilderness boundary road of Olaf Knolls in T36N, R14W, section 32. Figure 1 illustrates the area burned by the fires and shows the location of the crushed desert tortoise.



Fire Suppression Activities During the 1996 Fire Season

The number of fires and acres that will burn through the end of calendar year 1996 cannot be predicted. The number of fires and the acreage that will burn is dependent on a variety of factors such as fuel loads, ignition of fuels via lightning strikes, human activities that cause fires such as unattended campfires; timing and intensity of rainfall; wind; and other factors, such as accessibility, that influence the speed with which a fire can be suppressed. Data from past fire seasons provide some insight into the probability of fire on the Arizona Strip District in 1996. Over the last 15 years an average of 10.6 fires per year have occurred in the Pakoon Basin. The average size of a fire in the Pakoon during this period was 645 acres. An average of 2.86 fires per year with an average size of 59.5 acres per fire burned on the Beaver Dam and Virgin slopes during the same period (Bureau 1995c). However, the number of fires that burn annually and the average fire size varies considerably. Fires are fueled primarily by cured stands of red brome, *Bromus rubens*, that dry in the spring and provide fuel for fires by late May or June. Lightning strikes during summer storms, particularly in June, July, August, and September, as well as human activities such as campfires, ignite the dried fuels. Most fires occur during the summer months, but the fire season can continue into the fall before winter rains and cooler temperatures reduce the fire hazard. In the fall months, fires are most likely to ignite along roadways. Based on previous experience, fires of several hundred acres are likely to occur during the 1996 fire season. Large fires of several thousand acres are possible.

Fire Suppression Objectives and Strategies

The Arizona Strip District Fire Management Activity Plan delineated fire management zones, representative locations, and suppression objectives within each management zone/location (Bureau 1995c). The management objective for the Pakoon Basin is to hold fires to 300 acres or less eight years out of 10 to protect the fragile desert environment and desert tortoises. Because of the remote nature of the Pakoon Basin and the time necessary to move fire crews to the area, fire suppression goals of less than 300 acres are considered infeasible (Bureau 1995c). On the Beaver Dam and Virgin slopes, the objective is to hold fires to 10 acres or less to protect desert tortoise habitat (Bureau 1995c).

Fire management begins with pre-season planning when habitat managers meet with fire specialists to develop fire fighting policy. At this time, specific areas of concern, such as desert tortoise critical habitat, research plots, and other sensitive areas are identified along with levels and methods of fire suppression appropriate for each area. During the fire season, the Fire Management Officer monitors fuel loads and weather, and moves fire crews and equipment into areas where they will be most effective if a fire starts.

The Incident Command System is the management structure for fire suppression. The Incident Commander is responsible for all activities on a fire. On large fires, suppression activities may be directed by a Incident Management Team. In either case, the Area Manager provides guidance on fire suppression objectives and resource concerns. The

Incident Commander or Team then incorporates these concerns into fire suppression strategies. The Incident Command System is highly regimented and hierarchal, with the roles of each level of command strictly defined. Information about desert tortoise habitat and other sensitive resource issues is provided to the Incident Commander by a Resource Advisor who acts as a liaison between the Area Manager and the Incident Commander. Resource Advisors also provide information to fire crews in regards to desert tortoise natural history and measures to minimize destruction of habitat and reduce the possibility that tortoises will be killed or injured during suppression activities. Monitors work directly with fire crews to ensure that protective measures endorsed by the Incident Commander are implemented. Examples of specific duties of monitors include surveys of potential campsites for tortoises and walking in front of fire engines to direct vehicles around tortoises and their burrows. Monitors and Resource Advisors serve as a resource for the Incident Commander but do not get involved in specific suppression tactics. All direction and orders to fire crews must come through the chain of command.

Fire suppression in desert tortoise habitat is most successful when immediate and effective action is taken to bring fires under control. A variety of fire suppression techniques and strategies are available to the Incident Commander. The suppression strategy and combination of techniques employed vary with conditions, including resource constraints. Safety of fire crews is paramount and the Incident Commander is afforded maximum flexibility to ensure that the fire is fought as effectively and safely as possible.

Once a suppression strategy is developed, hand crews are typically deployed to build and defend fire lines. Tracked vehicles can also be used to build fire lines. Fire engines are used to support fire crews and maintain fire lines, primarily along roads. Hot fires may require aerial drops of fire retardants from helicopters or fixed-winged aircraft. In addition, backfires are often set from roads or fire lines (Duck et al. 1994).

After a fire is out, rehabilitation and monitoring of the burned area is initiated. Fire lines, especially those created by tracked vehicles, are obliterated, and seeding or planting of burned areas is planned and implemented as needed or appropriate. A strategy for monitoring vegetation recovery is initiated. Finally, a post-fire critique is conducted to evaluate the effectiveness of the suppression activities and measures to minimize resource degradation. Procedures for future suppression strategies are revised based on this critique (Duck et al. 1994).

Proposed Mitigation Measures

The Bureau (1995a and b) proposes the following measures to reduce the possibility of take of desert tortoises and destruction of tortoise habitat during proposed fire suppression activities in calendar year 1996. These measures were employed in the Pakoon fires of June 29 to July 5, 1995.

1. All personnel on the fire shall be informed and educated about desert tortoises and the importance of protecting habitat and minimizing take. Fire crews shall be briefed on the desert tortoise in accordance with Appendix II of Duck et al. (1994).

2. Fire-related vehicles shall drive slow enough to ensure that tortoises on roads can be identified and avoided.

3. Resource Advisors shall be designated to coordinate desert tortoise and other resource concerns and serve as a liaison between the Area Manager and the Incident Commander. Monitors shall be designated to monitor fire suppression activities; to ensure protective measures endorsed by the Incident Commander are implemented; to survey prospective campsites, aircraft landing and fueling sites; and to perform other duties necessary to ensure adverse effects to desert tortoises and their habitat are minimized. Resource Advisors and monitors shall be on call 24 hours during the fire season.

4. Off-road vehicle activity shall be kept to a minimum. Vehicles will be parked as close to roads as possible, and vehicles shall use wide spots in roads to turn around. If off-road travel is necessary, a biologist or crewperson shall walk in front of the vehicle to direct the driver around tortoises and tortoise burrows. Whenever possible, local fire-fighting units should go off-road first because of their prior knowledge of the area.

5. Prior to moving a vehicle, personnel shall inspect under the vehicle for tortoises.

6. Campsites should be located outside of desert tortoise habitat, or in locations that are previously disturbed. If camps are located in desert tortoise habitat, surveys of the site should be conducted.

7. All aircraft landing and fueling areas within desert tortoise habitat must be surveyed and monitored for presence of desert tortoise prior to use to reduce chances of tortoises being killed.

8. Use of tracked vehicles in desert tortoise habitat shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire. Monitors shall walk in front of tracked vehicles to ensure minimal impacts to tortoises and their burrows. Equipment staging areas shall be surveyed for desert tortoises prior to use.

9. Fingers or patches of unburned vegetation within burned areas shall not be burned out as a fire suppression measure.

10. Fire crews shall, to the extent possible, obliterate vehicle tracks made during the fire, especially those of tracked vehicles.

11. Rehabilitation of the burned areas shall be considered, including seeding, planting of perennial species, etc.

12. Recovery of vegetation shall be monitored, including establishment and monitoring of paired plots, inside and outside of the burned area.

13. The effectiveness of suppression activities and desert tortoise mitigation measures shall be evaluated after a fire. Procedures shall be revised as needed.

STATUS OF THE SPECIES

On August 4, 1989, the Service published an emergency rule listing the Mojave population of the desert tortoise as endangered. In a final rule dated April 2, 1990, the Service determined the Mojave population of the desert tortoise to be threatened. The desert tortoise is a large, herbivorous reptile found in portions of the California, Arizona, Nevada, and Utah deserts, and in Sonora and northern Sinaloa, Mexico. The threatened Mojave population is found in California, Nevada, and north of the Colorado River in Arizona and southwestern Utah. In Arizona, desert tortoises of the Mojave population are most active during the spring and early summer when annual plants are most common. Additional activity occurs during warmer fall months and after infrequent summer monsoons. Desert tortoises spend the remainder of the year in burrows, escaping the extreme weather conditions of the desert.

The desert tortoise is threatened by numerous factors, most of which are human-caused. These factors include destruction, degradation, and fragmentation of desert tortoise habitat resulting from habitat conversion to urban or agricultural development, construction of roads, mining, sheep and cattle grazing, and other activities; direct mortality or removal of animals from populations due to collecting, road kills, etc.; and mortality due to an upper respiratory tract disease (URTD), particularly in the western Mojave Desert (Service 1994). Fire is an increasingly important threat to desert tortoise habitat. Over 500,000 acres of desert lands burned in the Mojave Desert in the 1980s. Fires in Mojave desert scrub degrade or eliminate habitat for desert tortoises (Appendix D of Service 1994).

The recovery plan for the Mojave population of the desert tortoise (Service 1994) proposes the establishment of 14 Desert Wildlife Management Areas (DWMAs) in six recovery units. Land management in DWMAs would target the reduction or elimination of those factors that have caused declines in desert tortoise populations. The boundaries of proposed DWMAs are not precisely defined in the recovery plan, but would be established by the Bureau and other land management agencies in coordination with the Service, State wildlife agencies, and others. Planning is underway to implement the recovery plan in all six recovery units. Draft or final documents to implement the plan in at least some recovery units are expected in 1996. Proposed fire suppression activities could occur anywhere in those areas that are likely to be included in the Arizona portions of the Beaver Dam Slope and Gold-Butte Pakoon DWMAs in the northeastern Mojave recovery unit.

The Service designated critical habitat for the Mojave population of the desert tortoise in a Federal Register notice dated February 8, 1994 (59 FR 5820-5846, also see corrections at 59

FR 9032-9036). Fire suppression activities addressed in this opinion could occur on any or all of the 338,700 acres of designated critical habitat in Arizona (Table 3).

Further information on the range, biology, and ecology of the desert tortoise can be found in Luckenbach (1982), Turner et al. (1984), Weinstein et al. (1987), various papers by J.R. Spotila and others in Herpetological Monographs published June 30, 1994, various papers in Bury and Germano (eds.)(1994), and Service (1994).

ENVIRONMENTAL BASELINE

Project Location and General Vegetation Communities:

Proposed fire suppression activities would occur in northwestern Mohave County, Arizona, in an area bordered by the Colorado River on the south, the Utah border on the north, the Grand Wash Cliffs on the east, and the Nevada border on the west. Within this area, the most important desert tortoise habitat occurs within the Mohave desertscrub community (Bureau 1995c, Brown 1982). The creosote bush series of Mohave desertscrub occurs between 1,500 to 4,000 feet and averages 5 to 10 inches of precipitation annually (Turner 1982, Bureau 1995c). The major plants in this series are creosote, *Larrea tridentata*; white bursage, *Ambrosia dumosa*; range ratany, *Krameria parviflora*; and galleta grass, *Hilaria rigida*. Galleta grass; sand dropseed, *Sporobolus cryptandrus*; and Indian ricegrass, *Oryzopsis hymenoides*; make up, on average, about four percent of the species composition of this series. Annual grass and forb production is dependent on precipitation and varies from zero to as high as 4,000 pounds per acre. Desert tortoise habitat is also found within the blackbrush series of Mohave desertscrub (Turner 1982, Bureau 1995c),

Areas of particularly high annual production are most likely to carry fire. These areas occur primarily on the eastern and northern portions of the Pakoos Basin. Annual production and the chance of catastrophic fire is typically much lower elsewhere within desert tortoise habitat, including the Beaver Dam Slope, Virgin Slope, and the west side of the Pakoos Basin.

Status of the Desert Tortoise in the Project Area:

Information on desert tortoise distribution and abundance in the project area is derived primarily from triangular, 1.5 mile by 10-yard, line transects, as well as from three study plots, one in the Pakoos Basin and two on the Beaver Dam Slope. The transect data provide distributional information and rough estimates of relative density throughout the range of the tortoise on the Arizona Strip District, while the plot data detail densities, demographics, and trends at specific sites.

Desert tortoise densities have been determined several times since 1977 on the two Beaver Dam Slope study plots, each of which is one square mile. The data from these plots indicate a nearly stable population structure over 12 years with an increase in the relative numbers of

female tortoises on one plot. Numbers of tortoises found on the plots have varied from 46 to 53 (Littlefield Plot) and 20 to 35 (Exclosure Plot) (Hohman and Ohmart 1978, Bureau 1995c, Duck and Snider 1988, Rourke 1993, Duck and Schipper 1989). The Pakoon Basin Plot has been censused once, in 1991, at which time 10 live tortoises were found. This plot is two square miles in size.

Transects have been conducted throughout the range of the tortoise on the Arizona Strip since 1975 (Bureau 1995c, 1991). These transects suggest the tortoise occurs on approximately 300,000 acres of the Arizona Strip (Bureau 1995c). The greatest number of sign, suggesting the greatest relative abundance of tortoises, has been registered on the Beaver Dam Slope, on the Virgin Slope near Littlefield, and in the western and southern portions of the Pakoon Basin. Data from these transects and the study plots indicate that tortoise densities in the region are low to moderate, usually less than 50 per square mile. Large areas of unsuitable habitat are interspersed among areas suitable for tortoises. Sheltersite availability appears to be a primary limiting habitat factor (Bureau 1995c).

Threats to Desert Tortoises and Their Habitat Specific to the Project Area

A general listing of threats that have contributed to the declining status of the desert tortoise and that ultimately triggered listing of the species as threatened and designation of critical habitat is presented in the section entitled "Status of the Species." These threats are primarily human-caused factors, many of which occur in the project area.

The Desert Tortoise Recovery Team rated the degree of threats, on a scale of one to five (five being the greatest) in each proposed DWMA throughout the range of the Mojave population of the desert tortoise. Four of the fourteen DWMA's, including the Beaver Dam Slope DWMA, were rated a five, with extremely high threats to the desert tortoise populations in those areas (Brussard et al. 1994). Important threats on the Beaver Dam Slope include off-highway vehicle recreation, proliferation of roads and routes, mortality of tortoises on roads, particularly Highway 91, collection of tortoises, death and mortality of tortoises due to URTD, and reduced habitat quality due to a long history of cattle grazing, mining, and increasing development near Beaver Dam (Brussard et al. 1994, Service 1994). Many of the same threats also affect tortoises on the Virgin Slope, located south of the Virgin River and north and west of the Virgin Mountains, albeit to a lesser degree.

The Pakoon Basin, because of its remote nature and limited access is subjected to fewer human intrusions that affect desert tortoises. The Desert Tortoise Recovery Team rated the threats to tortoises in this area as a two (low-moderate). Fire is probably the most significant threat; approximately 100,000 acres of tortoise habitat, primarily in the northeastern portion of the basin, have burned since the 1940's (Bureau 1995c). Areas that have been burned by especially hot fires or that have burned repeatedly no longer support desert tortoises (Tim Duck, pers. comm. 1994). Other threats to tortoises and tortoise habitat in the area include widespread cattle grazing, off-highway vehicles, and URTD.

EFFECTS OF THE PROPOSED ACTION

Effects of fire suppression activities can be segregated into two categories. First, suppression operations, including building of fire lines, backfires, establishment and use of campsites, use of fire retardants, and other fire-fighting activities, may result in destruction of desert tortoise habitat and injury or death of individuals tortoises. Secondly, the effectiveness of fire suppression is directly related to the extent of habitat loss resulting from fire. Rapid and effective fire suppression minimizes the size of fires and loss of habitat.

Habitat Loss and Death or Injury of Desert Tortoises Resulting From Suppression Activities

During the Pakoon fires, a juvenile desert tortoise was apparently crushed and killed on July 1, 1995 by a fire vehicle (Bureau 1995a). Although this is the only confirmed death or injury to a desert tortoise during fire suppression activities, operations during fires have significant potential for resulting in take. Tortoises could be killed or injured during construction of fire lines, whether lines are constructed by hand or with vehicles. Establishment of campsites and aircraft landing/fueling sites could result in death or injury of tortoises, and burrows and clutches of eggs could be destroyed at these locations. Roads and fire lines created during suppression activities may provide access routes for recreationists. Use of these new routes may facilitate off-highway vehicle use and associated habitat damage, as well as crushing of tortoises by vehicles or collection of animals as pets. Although backfires may ultimately minimize the extent of a fire, they have the potential to destroy desert tortoise habitat and injure or kill tortoises in the path of the backfire. Finally, refuse left by fire crews at campsites or other locations could attract predators of desert tortoises, particularly common ravens, *Corvus corax*, and coyotes, *Canis latrans*. Concentrations of predators could further exacerbate the effects of the fire on tortoise populations because tortoises may be more exposed due to a lack of shrub cover, and therefore more susceptible to predation.

Fire retardants are used in suppression efforts on the Arizona Strip District, particularly on larger fires. Retardants include water, an iron oxide slurry, a fugitive retardant made of phosphorus and red dye, and foams, which act as surfactants, facilitating penetration of water into fuels. The iron oxide slurry is used infrequently. With the exception of water, which is considered benign or beneficial for tortoises and tortoise habitat, the effects of these retardants on tortoise populations are unknown. Some forms of retardants act as fertilizers and may contribute to increased plant production (Bill Leenhout, Fire Ecologist, Fish and Wildlife Service, Boise, Idaho, pers. comm. 1995).

Habitat Loss and Death or Injury of Desert Tortoises Resulting from Wildfire

Fires can result in direct mortality or injury of desert tortoises. Remains of 14 tortoises found near Bunkerville, Nevada were believed to have been killed by a wildfire (Woodbury and Hardy 1948). Esque et al. (1994) reported finding carcasses of tortoises killed by

wildfire. High intensity fires that occur when tortoises are active or occupying shallow cover sites may be particularly detrimental to tortoise populations (Esque et al. 1994). Indirect effects of fire on tortoises and their habitats may include reduced forage quantity and quality, loss of shrub cover that provides protection from predators and thermal stress, increased erosion and flooding, and possible reduced survivorship of juvenile tortoises (Esque et al. 1994, Bureau 1995c).

Many Mojave desert shrubs are poorly adapted to fire and are poor colonizers (Vasek 1980, 1983; Tratz and Vogel 1977). Fires in the Pakoan Basin are carried primarily by introduced stands of red brome. Repeated fires tend to convert desert shrub communities to annual grasslands (Appendix D of Service 1994, Bureau 1995c). Approximately 100,000 acres of desert tortoise habitat in the Pakoan Basin has been altered from a desert shrub to an annual grassland community (Bureau 1995c). Areas of the Pakoan Basin that have burned repeatedly are no longer inhabited by desert tortoises (Tim Duck, pers. comm. 1994). The annual grasslands, in which tortoises are disappearing, are the areas most likely to burn. Thus, the effects of fire suppression activities are somewhat ameliorated because suppression will often occur in these grasslands, rather than desert scrub habitats in which tortoises are more abundant. Loss of habitat due to fire is perhaps the greatest threat to desert tortoises in the Pakoan Basin.

Effective fire suppression can minimize habitat loss due to wildfire and is potentially very beneficial to the long-term maintenance of habitat quality and recovery of the tortoise on the Arizona Strip District. However, the benefits of fire suppression are tempered by the potential for direct loss of tortoises and habitat resulting from suppression activities, as discussed above. In addition, poor management of a fire may result in unnecessarily high levels of habitat loss and mortality of tortoises resulting from wildfire. The greatest benefit to the desert tortoise can be accrued when fire suppression maneuvers are carefully planned and monitored, fires are rapidly brought under control, and appropriate mitigation measures are applied to prevent loss of individual tortoises and habitat (Esque et al. 1994). Because portions of the Pakoan Basin are no longer inhabited by tortoises, suppression activities should stress the protection of those areas still supporting tortoise populations, particularly areas of relatively pristine stands of native shrubs and grasses. Protection of islands of unburned habitat within burns should also be targeted because these areas likely provide refugia and seed sources for future recolonization by native shrubs and tortoises.

Effectiveness of Proposed Mitigation

The Bureau has proposed a number of actions that would act to limit or mitigate many of the adverse effects described above. Briefing fire personnel on the desert tortoise, use of Resource Advisors and monitors, minimization of off-highway vehicle activity, and limiting the use of tracked vehicles should all contribute to reduced incidence of mortality or injury of desert tortoises and lessen habitat damage attributable to fire suppression activities. Not burning out unburned patches of vegetation within burns and any rehabilitation efforts that are implemented and successful may speed the recovery of tortoise populations and native desert shrub habitats.

CUMULATIVE EFFECTS

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. Due to the extent of the lands in this area of the Mojave Desert administered by the Bureau and the National Park Service, many of the actions that are reasonably expected to occur within the vicinity of the project area would be subject to section 7 consultations. Considerable acreage between Interstate 15 and the Virgin River, near Beaver Dam and Littlefield, and in the vicinity of Mesquite, Nevada are privately owned. Continued development of these non-Federal lands is anticipated. Proposals are currently being developed for expanding the Beaver Dam Golf Course near Beaver Dam (Topham 1994), and for developing 2,000 acres of land between Beaver Dam and Interstate 15 (John Griffith, ERA Realtor, St. George, Utah, pers. comm. 1995). Non-Federal actions that may result in a take of desert tortoises require a section 10(a)(1)(B) permit from the Service. Cumulative impacts of future State and private projects will be addressed through the section 10(a)(1)(B) permit process.

SUMMARY OF EFFECTS

The Service believes the effects described above are neither likely to jeopardize the continued existence of the desert tortoise nor result in adverse modification or destruction of desert tortoise critical habitat. We present this conclusion for the following reasons:

1. Effective fire suppression minimizes loss of tortoise habitat and mortality and injury of desert tortoises resulting from wildfire.
2. The proponent's project description includes features to minimize take of desert tortoises and mitigate the direct and indirect impacts of the proposed action on the tortoise and its critical habitat.
3. The areas most likely to burn and be targeted for fire suppression are those areas with the greatest production of red brome. In many of these high risk areas, particularly in the northeastern portion of the Pakoos Basin, the habitat has already been degraded to the point that tortoises are absent or occur at low densities.

CONCLUSION

After reviewing the current status of the Mojave population of the desert tortoise, the environmental baseline for the action area, the effects of fire suppression activities during the Pakoos fires, cumulative effects, and effects of additional fire suppression activities predicted to occur in the 1996 fire season, it is the Service's biological opinion that fire suppression activities during the Pakoos fires and through the 1996 fire season are not likely to jeopardize the continued existence of the desert tortoise and are not likely to destroy or adversely modify desert tortoise critical habitat.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of a listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with this incidental take statement.

In regards to emergency consultation for the Pakoon fires of June 29 to July 5, 1995, the Service and the Bureau discussed and developed programmatic measures for minimizing take of desert tortoises during fire suppression at a workshop held in Boulder City, Nevada on January 17-19, 1995. These measures are described in the "Proposed Mitigation Measures" section of this biological opinion. Specifics of the Pakoon fires were also discussed in a telephone conversation between the Area Manager of the Shivwits Resource Area and Ted Cordery of this office on July 1, 1995. Because the Bureau implemented measures developed at the January 17-19 meeting and discussed needs for further measures with the Service on July 1 (no further measures were identified), the requirements for exemption from the taking provisions of section 9 have been met for this emergency action.

In regards to future fire suppression activities in 1996, the measures described below are non-discretionary and must be implemented by the agency, so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in section 7(o)(2) to apply. The Bureau has a continuing duty to regulate the activity covered by this incidental take statement. If the Bureau (1) fails to require any applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

The Service anticipates the following forms of take as a result of fire suppression activities during the 1996 fire season based on a worst case scenario in which as much as several tens of thousands of acres of tortoise habitat could burn:

- 1) Three desert tortoises in the form of direct mortality or injury resulting from operation of vehicles and equipment, development of campsites, aircraft landing/fueling sites, and equipment staging areas; construction of fire lines; and use of retardants.
- 2) Seven desert tortoises in the form of direct mortality or injury resulting from backfires.
- 3) Three desert tortoises in the form of harm resulting from habitat degradation or destruction resulting from backfires.
- 4) Ten desert tortoises through harassment associated with excavation of occupied burrows and movement of desert tortoises out of harm's way during fire suppression activities.

This biological opinion does not authorize any form of take not incidental to fire suppression activities in calendar year 1996 in desert tortoise habitat on the Shivwits Resource Area. If the incidental take authorized by this opinion is met, the Bureau shall immediately notify the Service in writing. If the incidental take authorized by this opinion is exceeded, the Bureau must immediately reinitiate consultation with the Service to avoid a violation of section 9 of the Act. In the interim, the Bureau must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). The Bureau should provide to this office an explanation of the cause of the taking.

EFFECT OF THE TAKE

In this biological opinion, the Service finds that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize the incidental take authorized by this biological opinion:

1. Personnel education programs and well-defined operational procedures shall be implemented.
2. To the extent practicable, campsites, equipment staging areas, and aircraft landing/fueling sites shall be located outside of desert tortoise habitat. Where adverse effects to individual tortoise cannot be avoided, the animals shall be moved from harm's way.
3. Elevated predation by common ravens or other predators attributable to fire suppression activities shall be reduced to the maximum extent possible.

4. The Bureau shall monitor the level of incidental take resulting from the proposed action and provide a report to the Service summarizing the findings of the monitoring.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Bureau must comply with the following terms and conditions in regards to future fire suppression activities during calendar year 1996. These terms and conditions implement the reasonable and prudent measures described above. Terms and conditions are nondiscretionary with the following exceptions. The Incident Commander or Incident Management Team, in consultation with the Resource Advisor, may elect not to implement specific terms and conditions if their implementation would place personnel in immediate danger, or delays caused by implementation would compromise efforts to suppress the destruction of desert tortoise habitat by wildfire. These specific terms and conditions are: 1.b., 1.d., 1.e., 1.g., 2.a., and 3.a. All other terms and conditions are non-discretionary. Terms and conditions 1.a., 1.b., 1.c., 1.d., 1.e., 1.g., 1.h., 1.i., 1.j., 1.k., 1.l., and 2.a. are adapted from Bureau (1995b) and Duck et al. (1994). These terms and conditions only apply to fire suppression activities in desert tortoise habitat on the Arizona Strip District.

1. The following terms and conditions implement reasonable and prudent measure number one:

- a. All personnel on the fire shall be informed and educated about desert tortoises and the importance of protecting habitat and minimizing take. Fire crews shall be briefed on the desert tortoise in accordance with Appendix II of Duck et al. (1994).
- b. Fire-related vehicles shall drive slow enough to ensure that tortoises on roads can be identified and avoided.
- c. Resource Advisors shall be designated to coordinate desert tortoise and other resource concerns and serve as a liaison between the Area Manager and the Incident Commander/Incident Management Team. They shall also serve as a field contact representative (FCR) responsible for coordination with the Service. Monitors shall be designated to monitor fire suppression activities; to ensure protective measures endorsed by the Incident Commander/Incident Management Team are implemented; to survey prospective campsites and aircraft landing and fueling sites; and to perform other duties necessary to ensure adverse effects to desert tortoises and their habitat are minimized. Resource Advisors and monitors shall be on call 24 hours during the fire season.
- d. Off-road vehicle activity shall be kept to a minimum. Vehicles shall be parked as close to roads as possible, and vehicles shall use wide spots in roads or disturbed areas to turn around. If off-road travel is necessary, a biologist or crewperson shall walk in front of the vehicle to direct the driver around tortoises and tortoise burrows.

Whenever possible, local fire-fighting units should go off-road first because of their prior knowledge of the area.

e. Prior to moving a vehicle, personnel shall inspect under the vehicle for tortoises. If a tortoise is found under the vehicle, the tortoise shall be allowed to move away from the vehicle on its own accord, if possible. Otherwise, an individual qualified to move tortoises and approved by the Bureau shall move the tortoise to a safe locality in accordance with term and condition 2.c.

f. An objective of fire suppression strategies shall be the protection of key desert tortoise habitats, including designated critical habitat, areas designated in the future as DWMAs, and other areas identified by the Resource Advisor.

g. Use of tracked vehicles in desert tortoise habitat shall be restricted to improving roads or constructing lines where a short distance of line might save a large area from fire. Monitors shall walk in front of tracked vehicles to ensure minimal impacts to tortoises and their burrows. Impacts shall be avoided to the maximum extent possible by directing vehicles around burrows and tortoises. If impacts cannot be avoided, any tortoises in the path of the vehicle shall be moved from harm's way in accordance with term and condition 2.c.

h. Fingers or patches of unburned vegetation within burned areas shall not be burned out as a fire suppression measure.

i. The Bureau shall, to the extent possible, obliterate vehicle tracks made during the fire, especially those of tracked vehicles.

j. Rehabilitation of burned areas shall be considered, including seeding, planting of perennial species, etc.

k. Recovery of vegetation shall be monitored, including establishment and monitoring of paired plots, inside and outside of the burned area.

l. The effectiveness of suppression activities and desert tortoise mitigation measures shall be evaluated after a fire. Procedures shall be revised as needed.

2. The following terms and conditions implement reasonable and prudent measure number two:

a. To the maximum extent practicable, campsites, aircraft landing/fueling sites, and equipment staging areas shall be located outside of desert tortoise habitat or in previously disturbed areas. If such facilities are located in desert tortoise habitat, 100 percent desert tortoise surveys of the site shall be conducted by a qualified biologist

approved by the Bureau. Any tortoises found shall be moved to a safe location in accordance with term and condition 2.c.

b. If a desert tortoise burrow is found during 100 percent surveys of project sites, project boundaries shall be adjusted, if possible, to avoid adversely affecting the burrow. In determining possible effects to burrows, the Bureau shall consider that burrows may be as long as 30 feet. If disturbance of a desert tortoise burrow is unavoidable, it shall be examined for occupancy by tortoises. Burrows that will be disturbed by project activities, and which contain tortoises, shall be excavated and the tortoises relocated according to term and condition 2.c. If a tortoise is found above ground on a project site, activities that may result in a take shall cease until the tortoise moves out of harm's way, or is moved out of harm's way in accordance with term and condition 2.c.

c. If a desert tortoise is found on a project site, and project activities cannot be modified so as to avoid disturbance to it, the tortoise shall be relocated by a qualified biologist approved by the Bureau into the closest suitable habitat within two miles of the collection site that will ensure the animal is reasonably safe from death, injury, or collection associated with the project or other activities. The qualified biologist shall be allowed some discretion to ensure that survival of each relocated tortoise is likely. If the extent or direction of movement of the fire make sites within two miles of the project site unsuitable or hazardous to the tortoise or biologists attempting to access the area, the tortoise may be held until a suitable site can be found or habitat is safe to access and not in immediate danger of burning. The Resource Advisor shall contact the Arizona Ecological Services Field Office as soon as possible concerning disposition of any animals held for future release. Desert tortoises shall not be placed on lands outside the administration of the Federal government without the written permission of the landowner. Handling procedures for tortoises, including temporary holding facilities and procedures, shall adhere to protocols outlined in Desert Tortoise Council (1994).

d. The Resource Advisor or monitor(s) shall maintain a record of all desert tortoises encountered during project activities. This information shall include for each desert tortoise:

- The locations and dates of observation
- General condition and health, including injuries and state of healing and whether animals voided their bladders
- Location moved from and location moved to
- Diagnostic markings (i.e. identification numbers of marked lateral scutes)

No notching of scutes or replacement of fluids with a syringe is authorized.

The following term and condition implements reasonable and prudent measure number 3:

a. Work areas, including campsites, landing/fueling sites, staging areas, etc. shall be maintained in a sanitary condition at all times. Waste materials at those sites shall be contained in a manner that will avoid attracting predators of desert tortoises. Waste materials shall be disposed of at an appropriate waste disposal site. "Waste" means all discarded matter including, but not limited to, human waste, trash, garbage, refuse, oil drums, petroleum products, ashes, and equipment.

4. The following terms and conditions implement reasonable and prudent measure number 4.

a. By March 1, 1997, the Bureau shall submit a monitoring report to the Arizona Ecological Services State Office. The report shall briefly document fire suppression, rehabilitation, and monitoring activities during calendar year 1996. The report shall document the number of fires during 1996, acres of tortoise habitat burned, the effectiveness of the desert tortoise mitigation measures, the number of desert tortoises excavated from burrows, the number of desert tortoises moved from project sites, information on individual desert tortoise encounters as stipulated in term and condition 2.d., and any rehabilitation or monitoring activities. The report shall make recommendations for modifying or refining these terms and conditions to enhance desert tortoise protection.

b. The reasonable and prudent measures, with these terms and conditions, are designed to minimize incidental take that might result from with the proposed action. With implementation of these terms and conditions, the Service believes that no more than three tortoises will be taken as a result of direct mortality, one as a result of harm, and 10 as result of harassment from moving animals out of harm's way. If, during the course of the proposed action, this minimized level of incidental take is exceeded, such incidental take represents new information requiring review of the reasonable and prudent measures. The Bureau must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures and terms and conditions.

DISPOSITION OF DEAD, INJURED, OR SICK DESERT TORTOISES

Upon locating a dead, injured, or sick desert tortoise, initial notification must be made to the Service's Law Enforcement Office, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona, (Telephone: 602/261-6443) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible state. If possible, the remains of intact desert tortoises shall be placed with educational or research institutions holding

appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should any treated desert tortoise survive, the Service should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a)(1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of listed species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 2(c) or 7(a)(1) responsibilities for the desert tortoise. In furtherance of the purposes of the Act, we recommend implementing the following actions:

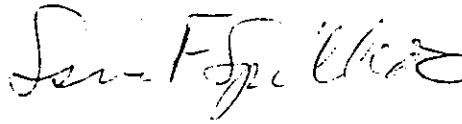
1. The Bureau should promptly complete an amendment process to the Arizona Strip District Resource Management Plan to implement the Desert Tortoise (Mojave Population) Recovery Plan (Service 1994). This amendment should include a comprehensive fire management plan that would provide maximum protection to desert tortoise habitat, including measures to avoid loss of habitat and mortality or injury of tortoises resulting from suppression activities.
2. The Bureau should initiate and coordinate a programmatic consultation on the effects of fire suppression activities throughout the range of the Mojave population of the desert tortoise. This consultation could address fire suppression activities on lands administered by the Bureau, National Park Service, Fish and Wildlife Service, and Department of Defense.
3. The Bureau should initiate studies to determine the effects of chemical fire retardants on the desert tortoise and its habitat.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

CLOSING STATEMENT

This concludes formal consultation on emergency fire suppression on the Pakoon fires and on programmatic fire suppression in desert tortoise habitat on the Arizona Strip District during calendar year 1996. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) the amount or extent of incidental take is

exceeded; 2) new information reveals effects of the agency action that may adversely affect listed species or critical habitat in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation. Any questions or comments should be directed to Jim Rorabaugh or Ted Cordery of my staff.



Sam F. Spiller

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (GM:GSV/LCR)
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State Supervisor, Fish and Wildlife Service, Reno, NV
State Supervisor, Fish and Wildlife Service, Salt Lake City, UT
State Director, Bureau of Land Management, Phoenix, AZ

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Director, Arizona Game and Fish Department, Phoenix, AZ

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